THE CERES S'COOL PROJECT

STUDENTS' CLOUD OBSERVATIONS ON-LINE

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CERES Science Team Meeting
Victoria, Canada
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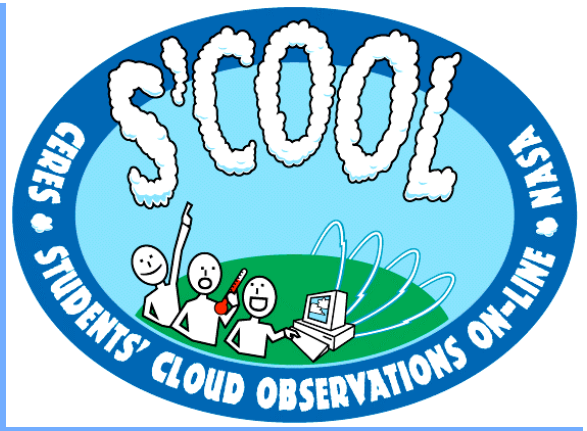
What is S'COOL?

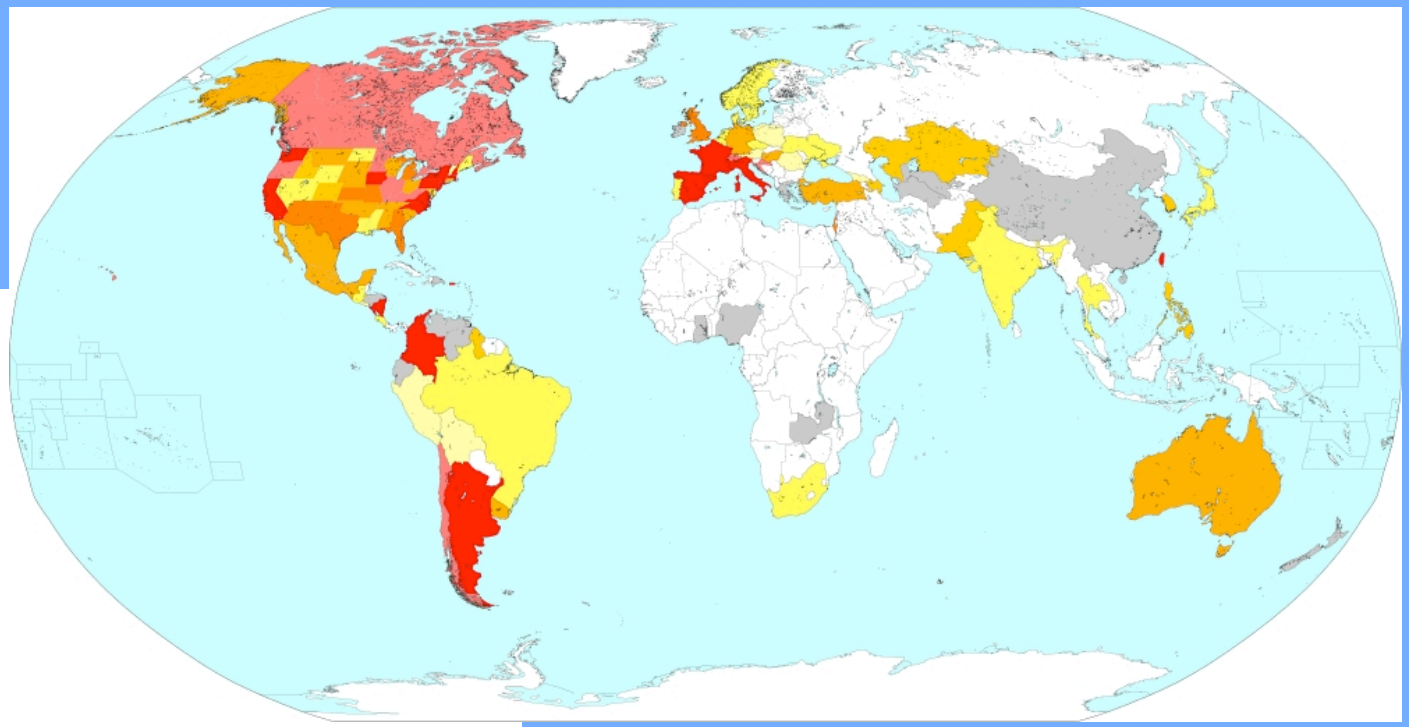


- Education and Public Outreach arm of CERES
- Backbone of Terra/Aqua formal education effort
- A simple way to involve K-12 students in authentic science
- A source of validation data for the CERES cloud retrievals

http://scool.larc.nasa.gov

S'COOL Project

- > 65,000 observations from 50 countries and all 50 states
- 43 % from outside the US (80% US participants)
- > 2,400 registered participants from 73 countries



Student Observations

- 1-10
- 11-50
- 51-100
- 101-250
- 251-500
- 501-1000
- >1000
- registered but no observations to date

Map as of Nov. 2007

Impact Measures

- ~60 requests for S'COOL materials since Apr. 2007

States "Top Five"	
▪PA	21%
▪VA	9%
▪PR	6%
▪NH	5%
▪CA	5%

Small Changes

Countries "Top Five"		
▪US	57%	↓
▪Colombia	10%	↑
▪France	7%	
▪Argentina	6%	
▪Taiwan	4%	

Still No Change

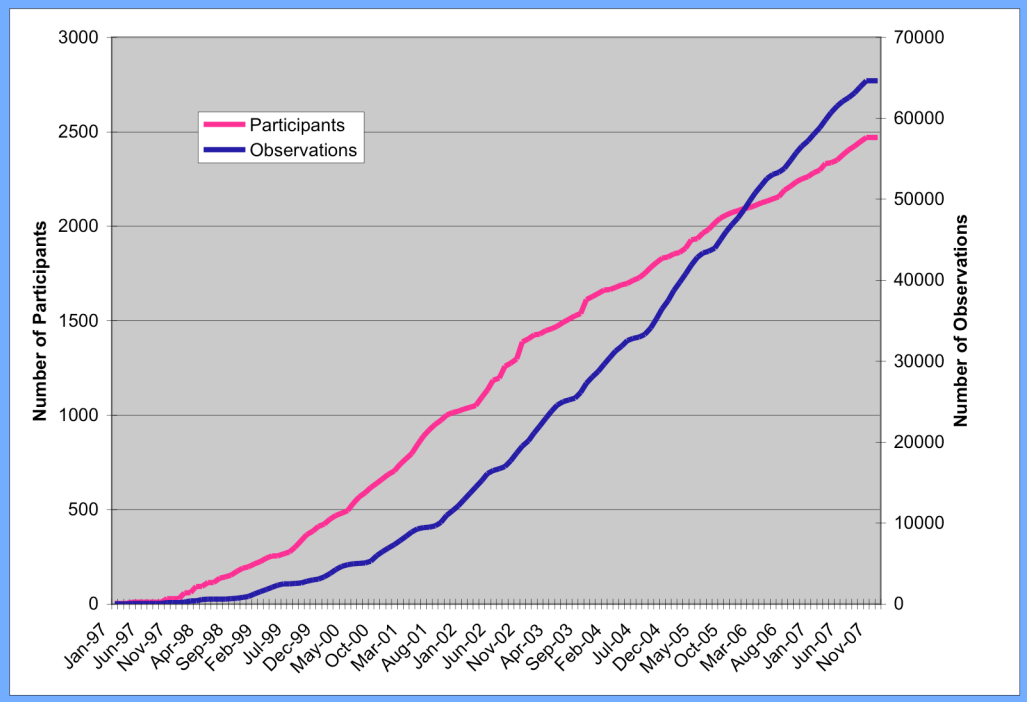
States "Bottom Five"	
▪Virgin Islands	9
▪Vermont	7
▪Guam	6
▪Delaware	3
▪Northern Marianas	0

(We have a new registrant in Guam, so there is hope.)

Impact Measures (cont'd)

Database of observations - as of Oct. 2007

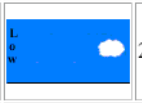
- > 28,500 satellite correspondences
  - For 44% of ground observations
- >2,400 registered participants
  - 39% submitted data
- 73 countries
  - data from 50 countries (68%)



S'COOL Data (Cont'd)

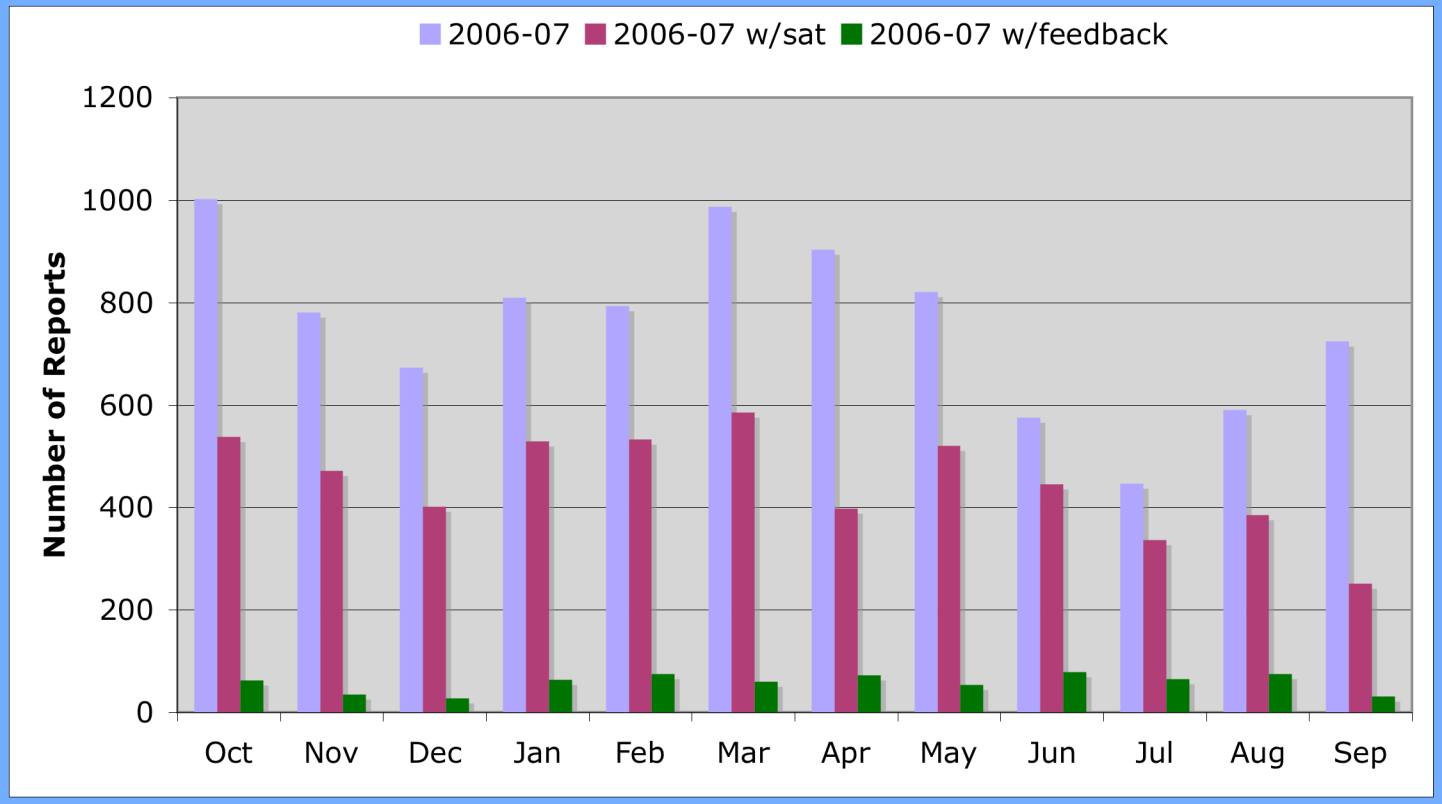
- 522 observations have both Terra and Aqua satellite match
- Under the current auto-email system, these are being shared immediately with the CERES clouds group.
  - Also can be explored on-line: http://scool.larc.nasa.gov/en_query_double_matches.html

Latitude	Longitude	City	State	Country
59.97	-154.85	Nondalton	AK	USA

Ground Observation: 62924				Aqua: 1165318					Terra: 1165809				
Date: 2007-04-05		Local Time: 13:57	Universal Time: 21:57	Date: 2007-04-05		Universal Time: 21:57:00			Date: 2007-04-05		Universal Time: 21:44:00		
Opacity	Cloud Cover	Type	Visualization		Altitude	Opacity	Cloud Cover	Phase Temp (C)		Altitude	Opacity	Cloud Cover	Phase Temp (C)
					9.26	Transparent 2.41	(5% to 50%) 49.80	ice 219.54		9.04	Translucent 4.16	(0% to 5%) 3.00	ice 221.07
					7.20	Opaque 23.36	(50% to 95%) 50.20	ice 234.84		6.75	Opaque 23.28	(95% to 100%) 96.55	ice 237.55
Opaque	(95% to 100%)	Stratocumulus								2.34	Opaque 22.73	(0% to 5%) 0.45	ice 258.50
													
Persistent Contrails: 00		Short-Lived Contrails: 00											
Surface Observations:	Snow/Ice: Yes Standing Water: No Muddy: No Dry Ground: Yes Leaves on Trees: No												
Temperature: 6.67 C Barometric Pressure: 985.66 hPa Relative Humidity: 57.00 %													
Comments: No comments provided by participant.													

(Aqua and Terra do not always match)

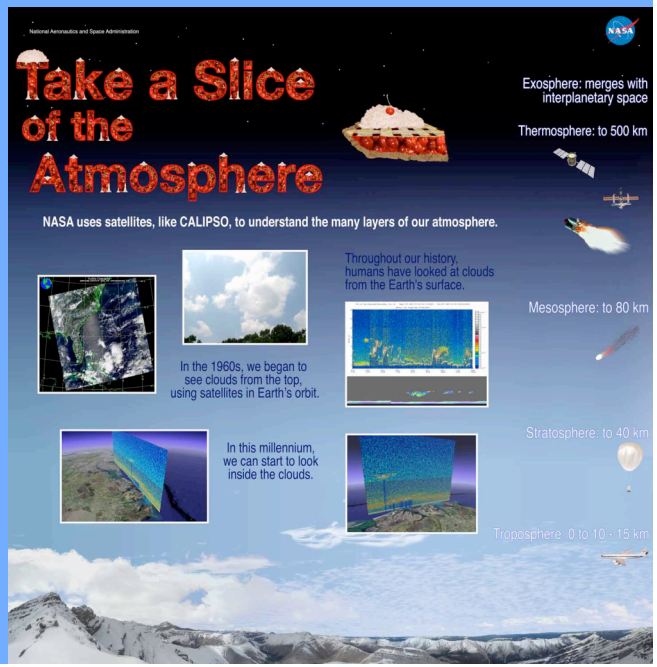
S'COOL Interaction



- 60 percent are getting satellite matches in past year (thanks to FLASHFlux!)
- 13 percent of those are sending comments on the match

S'COOL Presentations Since April 2007

- Presentations at regional Science Teachers Association Conference (NSTA); Detroit, MI
- Visited a school in Detroit
- Presentation at Virginia Association of Science Teachers (VAST)
- Educator and Homeschool Open Houses at Virginia Air and Space Center
- Exhibit at Virginia State Fair (10 days); LaRC 90th



S'COOL + SPHERE

- 3 college and one HS student this summer
- CALIPSO and CloudSat tutorials to access browse images
- Study of ground vs satellite cloud opacity
- Rework of data analysis portion of S'COOL project (Excel tools and tutorial)

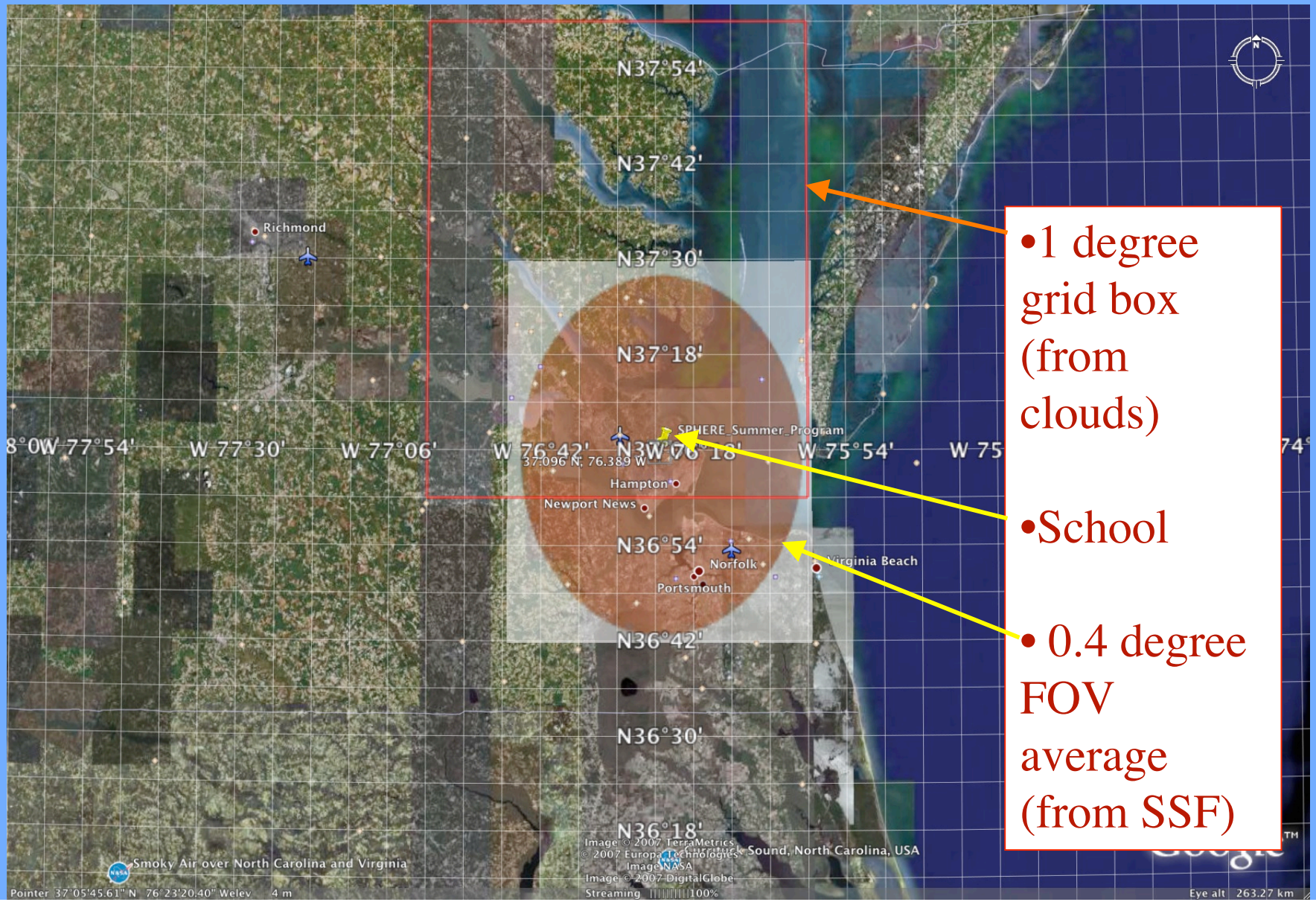
	Agree			Disagree						
	Ground	Satellite		Grd	Sat			Grd	Sat	
High	0	0	Table 1	0	1	Table 30		0	1	Table 37
Mid	0	0		1	0			0	0	
Low	0	0	460	0	0	0		1	0	3
High	0	0	Table 2	0	0	Table 31		0	0	Table 38
Mid	0	0		1	0			0	1	
Low	1	1	46	0	1	5		1	0	7
High	0	0	Table 3	0	1	Table 32		0	0	Table 39
Mid	1	1		1	1			0	1	
Low	0	0	5	0	0	3		1	1	110

		Ground report				
		No cloud	Clear	Partly Cloudy	Mostly Cloudy	Overcast
Sat report	No Cloud					
	Clear		16	7	4	0
	Partly		33	52	47	26
	Mostly		14	22	47	74
	Overcast		4	4	38	98

Total Cases with Cloud	486	Percentages
Complete agreement	213	43.83
Off by 1 Cloud Cover Class	221	45.47
Off by 2 Classes	48	9.88
Off by 3 Classes	4	0.82

http://asd-www.larc.nasa.gov/SCOOL/Enotes/en_aug2007.html

S'COOL + GoogleEarth



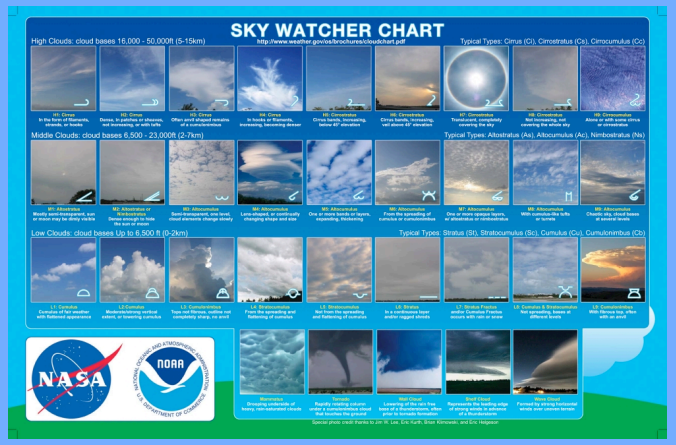
- 1 degree grid box (from clouds)
- School
- 0.4 degree FOV average (from SSF)

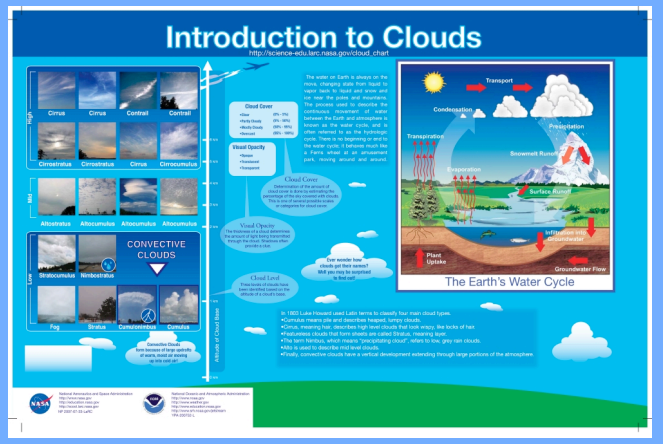
S'COOL in the Field

- Teacher Ambassador presentations:
  - Massachusetts Earth Central Institute (R. Snyder)
  - Tennessee Board of Regents (K. Affholter)
  - Regional NSTA meetings:
    - Carole Mashburn (workshop alumna; Birmingham, AL)
    - Dr. Debra Krumm (former CloudSat EPO lead; Denver, CO)

S'COOL Connections

- **Created cloud chart with NOAA NWS**
- **NOAA is printing > 1,000,000 copies!!!!**





- **S'COOL to be in a book!**
- "Pray Hard to Weather: Perceptions, Marketing, and Management of Weather in the United States Since 1900" by Dr. Bernard Mergen, University Press of Kansas, 2008.

Chapter 2 Managing Weather
Weather Scouts and S'COOL Kids

S'COOL Needs YOU!

- **Participants in every state and >70 countries**
  - Offer to serve as a **resource to a local teacher**
  - Arrange a **S'COOL visit when traveling**
  - Provide **S'COOL info to teachers you know**
- **Presentation materials available**, with script suggestions
- **Help with translation of materials**
- **Serve as resource for scientific content questions sent in by participants**